

Amendments to the Claims

1. (currently amended) A method for selecting multiple paths between a server and a client in an overlay network having a plurality of nodes connected by links, the plurality of nodes including the server and the client, each path including a set of selected links, comprising the steps of:

measuring, in each node of the overlay network, quality of service metrics of each link directly connecting the node to an immediate neighboring node in the overlay network;

transmitting the metrics to the server;

maintaining, in the server, the metrics, a link correlation matrix based on the metrics, in which the link correlation matrix is

$$Cr(L_{ij}, L_{mn}) = 1/2 + \frac{E[(L_{ij} - \bar{L}_{ij})(L_{mn} - \bar{L}_{mn})]}{2\sqrt{E(L_{ij}^2) - (\bar{L}_{ij})^2}\sqrt{E(L_{mn}^2) - (\bar{L}_{mn})^2}},$$

where ij and mn are a pair of links connecting two nodes, E is an expectation, L_{ij} and L_{mn} are the metrics for link ij and link mn , and an average $\bar{L}_{ij} = E(L_{ij})$, and a path correlation matrix based on the link correlation matrix; and

selecting, in the server, the multiple paths based only on the metrics, the link correlation matrix, and the path correlation matrix.

2. (original) The method of claim 1, further comprising:

streaming data from the server to the client via the multiple paths.

3. (previously presented) The method of claim 2, further comprising:

storing a copy of the streaming data only at the server.

1 4. (original) The method of claim 2, in which the streaming data are multimedia.

5. (canceled)

1 6. (original) The method of claim 1, in which the metrics include bandwidth,
2 latency, and packet loss rate of the link.

1 7. (original) The method of claim 1, in which the measuring, transmitting,
2 maintaining, and selecting are performed dynamically and periodically over a time
3 window.

1 8. (currently amended) The method of ~~claim 5~~ claim 1, in which the path
2 correlation matrix is

$$3 \quad Cr (Path_A, Path_B) = \sum_{a \in A} \sum_{b \in B} Cr (a, b),$$

4 where the path_A includes a link set $a \in A$ and the path B includes a link set $b \in B$.

1 9. (original) The method of claim 8, further comprising:

2 first selecting a first path based on the metrics;
3 updating an available bandwidth of each link according to previously
4 selected paths;

5 determining a correlation cost (cc) for each link L with respect to a previous
6 selected link set S of a path as

$$7 \quad Cr_S^L = \sum_{a \in S} Cr (L, a);$$

8 combining the correlation cost and the metrics to obtain a cost for each link
9 using a cost function

10
$$Cost_S^L = \alpha \cdot Cr_S^L + \sum_{i=1}^R \alpha_i W_r(i, j),$$

11 where W are the metrics, and α and α_i are weighting factors; and
12 selecting a next shortest path based on the updated cost $Cost_S^L$; and
13 repeating the updating, determining, combining, and selecting until the
14 plurality of paths have been selected.

1 10. (previously presented) The method of claim 1, in which the link correlation
2 matrix relates each link to all other links based on the metrics.

1 11. (previously presented) The method of claim 1, in which the path correlation
2 matrix relates each possible path to all other possible paths.